AMENDMENTS TO THE SPECIFICATION

Please amend paragraph **[0027]** as follows.

[0027] In the illustrated embodiment, source 210 creates entangled photons using photons from separate single-photon sources 212 and 214 and an optical system 216 that entangles the photon states. Optical system 216 can be a CNOT gate, for example, that converts an appropriate two-photon product state V (e.g., state $\{|0\rangle_1 + |1\rangle_1\} \mathrm{x} |0\rangle_2$) into an entangled state (e.g., state $|0\rangle_1 |0\rangle_2 + |1\rangle_1 |1\rangle_2$). O'Brien et al., "Demonstration of an All-Optical Quantum Controlled-NOT Gate," Nature, Vol. 426, pp. 264-267 (2003) describes an optical system implementing a CNOT gate for qubits represented using photon polarization states. A CNOT gate can also be implemented using non-linear optical systems. For example, U.S. Pat. App. Ser. No. ~~10/364,897~~ <u>10/364,987</u>, entitled "Quantum Information Processing Using Electromagnetically Induced Transparency" describes use of electromagnetically induced transparency (EIT) to create quantum gates such as a CNOT gate.

Please amend paragraph **[0052]** as follows.

[0052] As described above, the initial state V and the final state $\Sigma_s \Psi_s |s\rangle$ are linear combinations of product states $|s_1\rangle \mathrm{x} \ldots \mathrm{x} |s_n\rangle$. In a game where each state $|s_k\rangle$ has two ~~has two~~ basis states, each state V and Ψ_s can be mathematically represented as a state vector having 2^n components, and the operations (e.g., J, $U_1, \ldots, U_n$, J') can be represented by $2^n \mathrm{x} 2^n$ matrices that operate on the state vectors through matrix multiplications. Accordingly, the processing power required in the general case simulating a quantum game grows exponentially with the number of players, e.g., $O(n2^n)$ for matrix multiplications even if sparse matrix techniques are employed. A classical implementation of a general n-particle entangled quantum game thus becomes impractical for a game containing a large number of players n.

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